

## REMARKS

### I. Preliminary Comments

The present invention relates to lipoxygenase (LOX) polypeptides and genes encoding those polypeptides. Lipoxygenase polypeptides are characterized by the ability to oxidize fatty acid substrates such as linoleic and linolenic acids to produce C9 and C13 hydroperoxides. Such hydroperoxides can be further modified by other enzymes to produce C6, C9 and C12 compounds with characteristic flavors and aroma. While LOX genes have been identified and cloned for a number of plant species they have not previously been cloned from *Vitis vinifera* and there has existed no source to obtain pure *Vitis vinifera* LOX. The present invention provides purified and isolated polynucleotides encoding *Vitis vinifera* LOX polypeptides having lipoxygenase enzyme activity.

The Examiner indicated the subject matter of the claims to be free of the prior art but the pending claims have been amended in response to the outstanding objection and the rejections under 35 U.S.C. §112. In particular, claim 1 from which the remaining pending claims depend has been amended to recite DNA characterized by having at least 90% homology to the sequence as set forth in SEQ ID NO: 2 or SEQ ID NO: 4 and which encodes a lipoxygenase polypeptide having lipoxygenase enzyme activity. This amendment is supported in the specification such as at page 7 and elsewhere and does not introduce new matter into the specification.

Claim 11 has also been amended to correct an improper dependency. No new matter is introduced thereby.

## **II. The Outstanding Rejections**

Claims 1-6 and 8-18 stand rejected under 35 U.S.C. §112 (first paragraph) as failing to comply with the written description or enablement requirements.

Claims 1-6 and 8-18 also stand rejected for indefiniteness under 35 U.S.C. §112 (second paragraph).

Claims 11 and 12 stand objected to as being improperly dependent.

## **III. Patentability Arguments**

### **A. The Rejections of Claims 1-6 and 8-18 Under 35 U.S.C. §112 (First Paragraph) Should Be Withdrawn.**

The rejections of claims 1-6 and 8-18 under 35 U.S.C. §112 (first paragraph) for lack of written description and lack of enablement should be withdrawn in light of the foregoing amendments which more specifically recite the subject matter of the invention first in terms of its sequence (90% homology) and further in relation to the activity of the encoded polypeptide (having lipoxygenase enzyme activity). Both sequence homology and enzymatic activity are described in the specification and may be objectively measured by those of skill in the art.

The enablement rejection of claims 17 and 18 should be withdrawn because the person of ordinary skill in the art when provided with the LOX polypeptides having lipoxygenase activity of the invention would have the ability to use those polypeptides to modify the flavor of foods and beverages. Such flavor modification can be carried out by contacting the chemical components of those comestibles with the LOX polypeptide so as to catalyze the oxidation of fatty acid substrates such as linoleic and linolenic acids to C9 and C13 hydroperoxides which are flavor and aroma precursors. The specification at page 19, line 25 through page 22, line 19 provides a detailed description of such methods and the ordinary artisan would be capable of

practicing the flavor modification methods when supplied with the LOX polypeptides of the invention. While it is acknowledged that flavor modification is a complex art, the invention allows one of skill in the art to convert fatty acid substrates such as linoleic and linolenic acids to other compounds having characteristic flavors and aromas. Just because food and food recipes are quite complex does not mean, however, that the invention does not adequately describe and enable a tool to be exploited in the practice of that complex art. To use the Examiner's analogy Applicants need not provide an entire recipe for bread when their invention only relates to one aspect of flavoring bread.

**B.     The Rejections of Claims 1-6 and 8-18 Under 35 U.S.C. §112 (Second Paragraph) Should Be Withdrawn.**

The rejections of claims 1-6 and 8-18 under 35 U.S.C. §112 (second paragraph) for indefiniteness in light of the amendments made to the claims deleting the rejected language.

The rejection of claim 5 under 35 U.S.C. §112 (second paragraph) should be withdrawn because claim 5 does not function as a dependent claim further limiting claim 1. Instead, claim 5 is directed to quite different subject matter (i.e., the anti-sense polynucleotide from claim 1).

The rejection of claim 17 under 35 U.S.C. §112(second paragraph) should also be withdrawn because those of ordinary skill of the art, when supplied with the disclosure of the specification, would be able to determine what is and what is not encompassed by the claims directed to modifying flavor. Both chemical/analytical and organoleptic (taste) methods are well known in the art to determine whether flavor has been modified. Those of ordinary skill would be capable of determining whether a comestible contacted with a LOX polypeptide has had its taste so modified. Accordingly, the rejection for indefiniteness should be withdrawn.

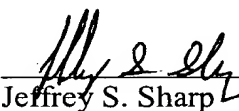
## CONCLUSION

For all of the foregoing reasons, the rejections should now be withdrawn and allowance of all pending claims 1-6 and 8-18 is respectfully solicited. Should the Examiner wish to discuss any issues of form or substance in order to expedite allowance of the pending application, he is invited to contact the undersigned attorney at the number indicated below.

Respectfully submitted,

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**March 18, 2004**

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